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Document Name: ABYC H-25: Portable Gasoline Fuel Systems for Flammable Liquids

CFR Section(s): 46 CFR 182.130

Standards Body: American Boat and Yacht Council



Official Incorporator:

THE EXECUTIVE DIRECTOR
OFFICE OF THE FEDERAL REGISTER
WASHINGTON, D.C.

H-25 PORTABLE GASOLINE FUEL SYSTEMS

Based on ABYC's assessment of the state of existing technology and the problems associated with achieving the requirements of the standard, ABYC recommends compliance with this standard by August 1, 1995.

25.1 PURPOSE

These voluntary technical practices and engineering standards are guides for the design, construction and stowage of portable tanks with related fuel lines and accessories comprising a portable gasoline fuel system for boats.

25.2 SCOPE

These voluntary technical practices and engineering standards apply to portable gasoline fuel systems for boats.

25.3 REFERENCED ORGANIZATIONS

ABYC - American Boat & Yacht Council, Inc., 3069 Solomon's Island Road, Edgewater, MD 21037. (410)956-1050.

ASTM - American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103.

UL - Underwriters Laboratories, Inc., 12 Laboratory Drive, PO Box 13995, Research Triangle Park, NC 27709. (919)549-1565.

25.4 DEFINITIONS

The following terms are defined for the purposes of these standards:

Gasoline - Includes all gasoline based fuels. The Federal Hazardous Substance Act classifies gasoline as "extremely flammable" having a flash point at, or below, -7°C (20°F).

Portable Fuel Systems - Tanks, fuel lines and related accessories that are not intended for permanent installations, but are used as an assembly conveying fuel to an engine.

Portable Fuel Tanks - Container, including caps and fittings supplied by the manufacturer, of not more than 26.5 liters (7 gallons) rated capacity, designed to be connected to engines by flexible fuel lines with connection fittings.

25.5 REQUIREMENTS - IN GENERAL

25.5.1 Portable fuel tanks shall have provisions to permit handling, securing aboard and removal for refilling.

25.5.2 Portable fuel tanks, pressurized by means other than vapor pressure of the fuel, shall not be used.

25.5.3 Portable gasoline fuel tanks shall be colored red.

25.6 **MATERIALS** - Materials used in the construction of portable fuel tanks and components for portable fuel systems shall meet the following requirements:

25.6.1 The corrosion resistance of tank materials shall be at least equivalent to 22 gauge terneplate steel with a 12 pound coating - minimum of 0.35 oz. lead per square foot by triple spot test and coated with baked paint or equivalent coating not less than .0015 inches thickness applied to the total tank exterior.

25.6.2 Non-metallic materials are considered acceptable for corrosion resistance; however, all other requirements of this standard must be met.

25.6.3 Materials shall demonstrate resistance to the following substances with which they may be normally in contact:

a. Lubricants (external and internal surfaces)

b. Detergents (external surfaces)

c. Reference Fuel C with 15% methanol (external and internal surfaces)

Samples of materials shall be immersed for a period of not less than 70 hours at 23 +/- 3°C (73 +/- 5°F). Materials shall have a shrinkage of not more than 1 percent, a weight loss of not more than 10 percent and a swelling of not more than 25 percent.

25.6.4 Non-metallic materials shall contain UV inhibitors.

25.6.5 Plastic materials, tested in accordance with UL Subject 94, dated April 28, 1985, and/or ASTM D635-81 shall not exceed a burning rate of one and one-half (1 1/2) inches per minute as specified for slow burning plastics.

25.6.6 Materials shall have mechanical strength to withstand usage throughout the temperature range of -18°C to 60°C (0°F - 140°F). (See ABYC H-25.7.4 and .5 and H-25.8).

25.6.7 Except for materials used for fuel line the minimum Vicat softening point of plastic shall be 112°C (235°F) in accordance with Rate A, ASTM D1525-76, "Test for Vicat Softening Point of Plastics," and a brittleness temperature not higher than -40°C (-40°F) in

accordance with ASTM D746-79, "Test for Brittleness Temperature of Plastics and Elastomers by Impact."

25.7 DESIGN AND CONSTRUCTION

25.7.1 Portable fuel tanks shall be designed so that:

25.7.1.1 when filled in its normal position, a 5% air expansion volume is ensured.

25.7.1.2 service and vent openings are above the liquid level when filled to capacity in its normal filling position.

25.7.1.3 service and vent openings can be closed so they are liquid and vapor tight and not subject to accidental openings.

25.7.1.4 service and vent openings are located to minimize damage to fuel line connector.

25.7.1.5 tank bottom surfaces shall be capable of withstanding abrasion when tested in accordance with the vibration test section of UL 1185.

25.7.2 The bottom or base of the portable fuel tanks shall have such relation to their height as to minimize accidental upset as demonstrated by their capability of remaining upright when inclined up to 35° from the horizontal in any direction in their normal use position when filled to its rated capacity. Portable fuel tanks shall be capable of remaining upright when inclined up to 20° from the horizontal in any direction in their storage.

25.7.3 Each provision for securely grasping and lifting and its attachment shall be capable of withstanding 5 times the suspended weight of the tank filled to its rated capacity.

25.7.4 A portable fuel tank, when filled to its rated capacity with water and glycol (excluding expansion space), shall not show evidence of leakage when dropped from a height of 1.2m (4 feet) onto a flat concrete surface so as to strike on a corner. Plastic tanks shall be preconditioned for this test by pre-soaking the portable fuel tank for at least 18 hours with ASTM reference fuel C with 15% methanol. The tank will then be emptied and refilled with the water-glycol mix and stabilized at -18 +/- 3°C (0 +/- 5°F).

25.7.5 The portable fuel tank, including permanently attached hose assemblies, shall be capable of withstanding the following test without leakage:

25.7.5.1 The tank shall be preconditioned by filling it to its rated capacity with ASTM D471-79 Reference Fuel C with 15% methanol (or the ASTM reference fuel with alcohol) for at least 30 days at 21°C +/- 3°C (70°F).

25.7.5.2 After preconditioning, the portable fuel tank shall withstand the expansion and contraction test of UL 1185, without leakage, substituting ASTM Reference Fuel C with 15% methanol for the N-Heptane specified in UL 1185.

25.8 FUEL LINE AND RELATED ACCESSORIES FOR PORTABLE FUEL TANKS

25.8.1 Fuel lines shall be flexible, so that they will not crack, check or break if coiled around a diameter of four times the hose's outside diameter after 8 hours exposure to temperatures of 0°C and 60°C (32°F and 140°F).

25.8.2 Quick disconnect fittings used between engine and fuel lines, and fuel line and tank shall automatically shut off fuel flow when disconnected.

25.8.3 Each fuel line hose connection shall be capable of withstanding a static load of 40 lb. minimum static pull for one minute.

25.9 LABELING

25.9.1 Portable tanks shall be clearly and permanently marked with:

- a. capacity liters (gallons), and
- b. tank manufacturer's name or trademark and address.

25.9.2 The Federal Hazardous Substance Act imposes labeling requirements for flammable and combustible substances. The label for portable fuel tanks must contain the following (see Figure 1):

FIGURE 1 - LABELING INFORMATION

NAME AND ADDRESS OF MANUFACTURER

DANGER

GASOLINE

**EXTREMELY FLAMMABLE - HARMFUL OR
FATAL IF SWALLOWED**

**IF SWALLOWED DO NOT INDUCE VOMITING
CALL A PHYSICIAN IMMEDIATELY**

**KEEP CLOSED WHEN NOT IN USE
KEEP AWAY FROM HEAT, SPARKS AND OPEN
FLAME**

**SECURE IN A WELL VENTILATED LOCATION
REMOVE FROM BOAT WHEN FILLING
KEEP OUT OF REACH OF CHILDREN**

- a. Name of hazardous substance.

GASOLINE

Minimum letter size: 10 point

- b. A signal word.

DANGER

Minimum letter size: 18 point, all capital letters (see ABYC H-25.9.3)

- c. A statement of the hazard.

EXTREMELY FLAMMABLE, HARMFUL OR FATAL
IF SWALLOWED

Minimum letter size: 12 point, all capital letters

- d. Precautionary measures describing the action to be followed or avoided:

- (i) First aid instructions.

IF SWALLOWED, DO NOT INDUCE VOMITING,
CALL A PHYSICIAN IMMEDIATELY

Minimum letter size: 10 point

- (ii) Handling and storage instructions.

KEEP CLOSED WHEN NOT IN USE.
KEEP AWAY FROM HEAT, SPARKS AND OPEN
FLAME.
SECURE IN A WELL VENTILATED LOCATION.
REMOVE FROM BOAT WHEN FILLING.

Minimum letter size: 10 point

- (iii) Statement for the protection of children.

KEEP OUT OF REACH OF CHILDREN.

Minimum letter size: 10 point

25.9.3 The signal word, the statement of principal hazard(s), any cautionary information and instructions to read carefully, shall be placed together on the main (front) panel of the label. This information shall be distinctively apart from other wording and designs. The necessary prominence shall be achieved by placement within the borders of a square or rectangle with or without a borderline, and by use of suitable contrasts with the background achieved by distinctive typography or color or both when needed.

25.9.4 All required label information may appear on the main panel, but if they do not, they shall be together in a

distinctive place elsewhere on the label with adequate contrast achieved by typography, color or layout, except that the name of the manufacturer may appear separately on the same (see ABYC H-25.9.3), or on a different, panel. The type size used shall be reasonably relative to the rest of the printing on the panel involved and cannot be smaller than 10 point type unless the size of the product requires label reductions, in which case no smaller than 6 point type can be used.

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